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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/760,651	01/20/2004	Gregory Edward Tierney	200313615-1	9869

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EXAMINER	
PHAN, RAYMOND NGAN	
ART UNIT	**PAPER NUMBER**
2111	

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	03/28/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary	Application No.	Applicant(s)	
	10/760,651	TIERNEY ET AL.	
	Examiner	Art Unit	
	Raymond Phan	2111	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *Jan 8, 2007*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-35* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *12-24* is/are allowed.

6)☒ Claim(s) *1-3,8-10, 25 and 29-31* is/are rejected.

7)☒ Claim(s) *4-7,11,26-28 and 32-35* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

Part III DETAILED ACTION

Notice to Applicant(s)

1. This action is responsive to the following communications: remarks filed on January 8, 2007.

2. This application has been examined. Claims 1-35 are pending.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. § 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claims 1, 2-3, 8-10, 12, 16, 25, 29-31 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Asher et al. (US No. 6,654,858) in view of Khare et al. (US No. 6,615,319).

In regard to claims 1, 10, 25, 29, Asher et al. disclose a system comprising: a home node 520 that receives a first request for data from a first node 518 according to a first cache coherency protocol (i.e. directory-based coherency protocol) (see figure 3, col. 6, line 65 through col. 7, line 5) and provides a second request for the data based on the first request (see col. 7, lines 31-40); a second node that provides a conflict response to the second request (see col. 7, lines 44-62). Asher et al. do not specifically disclose the conflict response indicating that an ordering point for the data is migrating according to a second cache coherency protocol (i.e. broadcast-based coherency protocol), which is different from the first cache coherency protocol. However Khare et al. disclose the conflict response indicating that an ordering point for the data is migrating according to a second cache coherency protocol, which is different from the first cache coherency protocol (see

col. 7, lines 7-34). Therefore, it would have been obvious to a person of an ordinary skill in the art at the time the invention was made to have combined the teachings of Khare et al. within the system of Asher et al. because it would be desired to have distributed mechanism for resolving cache coherence conflicts in a multiple processing node.

In regard to claim 2, Khare et al. disclose wherein the home node provides a retry request associated with the second request for the data in response to the conflict response from the second node (see col.7, lines 6-34). Therefore, it would have been obvious to a person of an ordinary skill in the art at the time the invention was made to have combined the teachings of Khare et al. within the system of Asher et al. because it would be desired to have distributed mechanism for resolving cache coherence conflicts in a multiple processing node.

In regard to claim 3, Khare et al. disclose wherein, in response to the retry request associated with the second request, the home node and the first node each receives a response that includes a copy of the data which completes the request for the data from the first node according to the first cache coherency protocol (see col. 7, lines 6-53). Therefore, it would have been obvious to a person of an ordinary skill in the art at the time the invention was made to have combined the teachings of Khare et al. within the system of Asher et al. because it would be desired to have distributed mechanism for resolving cache coherence conflicts in a multiple processing node.

In regard to claims 8-9, 16, 30, Asher et al. disclose wherein the first cache coherency protocol comprises a forward progress cache coherency protocol (i.e. directory-based protocol) (see col. 5, lines 5-10).

In regard to claim 31, Asher et al. disclose a multi-processor computer system comprising: a home node 520 provides at least one snoop to obtain a copy of a line of data in response to a request provided by a first processor in directory-based coherency protocol (see figure 3, col. 6, line 65 through col. 7, line 5), the home node reissues the snoop request from the home node in response to receiving a response at the home node (see col. 7, lines 44-62). But Asher et al. do not specifically disclose the response associated with migration of an ordering from a cache of the first processor to a cache of a second processor. However Khare et al. disclose the response associated with migration of an ordering from a cache of the first processor to a cache of a second processor (see col. 7, lines 6-34). Therefore, it would have been obvious to a person of an ordinary skill in the art at the time the invention was made to have combined the teachings of Khare et al. within the system of Asher et al. because it would provide a flexible mechanism for enforcing the coherency among cache structures.

Allowable Subject Matter

6. Claims 12-24 are allowable over the prior of records.

7. Claims 4-7, 11, 26-28, 32-35, are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.
The following is an Examiner's statement of reasons for the indication of allowable subject matter: Claims 11-12, 32, are allowable over the prior art of record because the Examiner found neither prior art cited in its entirety, nor based on the prior art, found any motivation to combine any of the said prior arts which teach a plurality of cache lines, each of the first and second nodes being programmed to facilitate interaction between the first protocol and the second protocol during

migration of the ordering point from the cache of the second node to the cache of the first node (claim 11); the home node reissues the at least one snoop when another copy of the line of data exists in the system associated with a broadcast-based protocol and no copy of the line of data is returned in response to the request provided by the first processor in the forward progress protocol, the another copy of the line of data being at least as up-to-date as the line of data in memory associated with the home node (claim 12); source broadcast request to the first processor for the data according to a broadcast-based protocol, the ordering point migrating in response to the source broadcast request for the data (claim 32).

The remaining claims, not specifically mentioned, are allowed for the same rationale as set forth in their parent claims.

8. The reason for allowance of claims 4-7, 13-15, 18-24, 26-28, 35 can be found in the previous Office Action.

Response to Amendment

9. Applicant's amendment and arguments, see pages 9-14, filed on January 8, 2007, with respect to the rejections of claims 1-3, 8-12, 16-17, 25, 29-34 under 35USC103(a) have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new grounds of rejection is made in view of Khare et al.

Conclusion

10. Claims 1-3, 8-10, 25, 29-31 are rejected. Claims 4-7, 11, 26-28, 32-35 are objected. Claims 12-24 are allowed.

11. The prior arts made of record and not relied upon are considered pertinent to applicant's disclosure.

Webber (US No. 6,631,448) discloses a cache coherence unit for interconnecting multiprocessor nodes having pipelined snoopy protocol.

Baylor et al. (US No. 5,893,922) disclose a home node migration for distributed shared memory systems.

Ebrahim et al. (US No. 5,706,463) disclose a cache coherent computer system that minimizes invalidation and copyback operations.

1. Any inquiry concerning this communication or earlier communications from the examiner should be directed to examiner Raymond Phan, whose telephone number is (571) 272-3630. The examiner can normally be reached on Monday-Friday from 6:30AM- 4:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mark Rinehart can be reached on (571) 272-3632 or via e-mail addressed to mark.rinehart@uspto.gov. The fax phone number for this Group is (571) 273-8300.

Communications via Internet e-mail regarding this application, other than those under 35 U.S.C. 132 or which otherwise require a signature, may be used by the applicant and should be addressed to **[raymond.phan@uspto.gov]**.

All Internet e-mail communications will be made of record in the application file. PTO employees do not engage in Internet communications where there exists a possibility that sensitive information could be identified or exchanged unless the record includes a properly signed express waiver of the confidentiality requirements of 35 U.S.C. 122. This is more clearly set forth in the Interim Internet Usage Policy published in the Official Gazette of the Patent and Trademark on February 25, 1997 at 1195 OG 89.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see hop://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Any inquiry of a general nature or relating to the status of this application should be directed to the TC 2100 central telephone number is (571) 272-2100.

Raymond Phan
March 23, 2007